

Gaudiella minuta, A New Genus and Species of Mite (Acarina: Acaridia) Belonging to the New Family Gaudiellidae^{1,2}

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ABSTRACT

A new family, genus, and species, Gaudiellidae, *Gaudiella minuta*, is described from a stingless bee, *Melipona quadrifasciata* Lep., from Brazil.

Originally, we had intended to publish a new genus and species, but to assign the unique specimen being studied, it was necessary to delve into the higher classification of the Astigmata. In this study we discovered an interesting method of partially defining some of the higher categories with both morphological and biological characterizations.

Utilizing the suprafamilial groups of Krantz (1970) as an example, the suborder Astigmata (Acaridia of authors) is divided into 2 supercohorts—the Acaridia with the superfamilies Anotoidea, Canestrinoidea, and Acaroidea, and the supercohorts Psoroptidia with the remaining superfamilies including Ewingoidea, Psoroptoidea, Analgoidea, and Sarcoptoidea. Using the chaetotaxal and solenidiotaxal signatures of Grandjean (1939), the following characters can be used to separate certain suprafamilial taxa without resorting to host data or pretarsal modifications:

1. Supercohort Acaridia, superfamily Anotoidea: tibia I with two ventral setae (*gT*, *hT*) and solenidion φ ; venter with 2 pairs of large ring structures not associated with the genital region; genital discs large.

2. Supercohort Acaridia, superfamily Aca-

roidea: tibia I with 2 ventral setae and solenidion φ ; venter with 2 pairs of well-developed genital discs associated with genital region.

3. Supercohort Acaridia, superfamily Canestrinoidea: tibia I with only solenidion φ , without ventral setae; venter with 2 pairs of well-developed discs associated with region.

4. Supercohort Psoroptidia, superfamily Ewingoidea: tibia I with 2 ventral setae and with atrophied genital discs; all other superfamilies (we have not examined all families): tibia I with 1 ventral seta (*gT*) and solenidion φ ; venter without genital discs or with atrophied genital discs associated with genital region.

The new taxon, *Gaudiella minuta*, is adequately distinct to be considered to represent a new family in the Acaroidea, Gaudiellidae. Characters are the maximal leg chaetotaxy of Grandjean (1939), the external morphology of Knülle (1959), and the idiosomal chaetotaxy of Atyeo and Gaud (1966). The mite has features typical of the Acaridia and others common to most Psoroptidia but with the following differences:

1. Well-developed genital discs associated with the genital region.

2. Two pairs of setae ventrolateral on tibia I.

3. Four pairs of lyrifissures (lyriform pores), of which 3 pairs are on the dorsal idiosoma and one pair is subterminal, lateral to the anal slit.

4. Many pairs of setae surrounding the anal slit. In the Psoroptidia, there are usually 1 or 2 pairs.

5. Seta *wF* on tibia IV. Although this seta occurs in the Psoroptidia, it is very rare.

6. Setae *u*, *v* and *p*, *q* at the apices of the tarsi. In the Psoroptidia (and many Acaridia), these setae are absent or only *p* and *q* are present.

¹Research supported in part by the National Science Foundation (GB-15105).

²Published by permission of the Director, New York State Science Service, Journal Series No. 168.

7. Found on insects—common hosts for parasitic or phoretic forms of the Acaridia.

These differences from the generalized Acaroidea usually would not be sufficient for the establishment of a new family. Singly, some of these differences can be found in known taxa, but together the unique morphological modifications give sufficient evidence for establishing the family Gaudiellidae. The following characteristics are distinctive of this new family.

1. The disc-shaped ambulacrum supported by a short stalk has only one counterpart in the supercohort Acaridia, namely, the Hypoderidae (Hypodectidae) (see Fain and Bafort, 1967). The Hypoderidae, subcutaneous parasites of birds in the deutonymphal stage, have a very reduced ambulacral disc reminiscent of the Sarcoptidae or similar to a clawless Glycyphagidae. The ambulacrum of the Gaudiellidae is similar to many of the taxa of the supercohort Psoroptidia, especially some of the Psoroptoidea and Analgoidea.

2. The structure of the oviporus is unique (fig. 2), although most components can be homologized with those of other Acaroidea (compare with *Glycyphagus destructor* (Schrank) as illustrated by Knülle, 1959, fig. 33).

3. The relative positions of the three dorsal lyrifissures and dorsal idiosomal setae are unique. In species that we are familiar with the general pattern of lyrifissures and setae can be related to those of *Acarus siro* L. as illustrated by Knülle (1959, fig. 20). In *Gaudiella minuta*, regardless of the interpretation of the setal pattern, there is little resemblance between the two conditions. One pair of dorsal hysterosomal setae is absent (either 1, 2 or h), and 1 pair of lyrifissures is almost middorsal in position in *G. minuta*.

4. There are no dorsal hysterosomal glands (opisthonotal glands), or is there evidence of a vestigial pore.

5. The sejugal suture is absent while there is a deep furrow on the prodorsal shield—almost a tectum.

6. An invagination lateral to the anterior genital setae is situated at the mesal termination of a thin, horizontal apodeme. This invagination could be the opening to a ventral hysterosomal gland; such a gland has been observed in males of 2 undescribed species of feather mites (Analgidae: Xolalginiae).

7. Certain setae and solenidia are lacking from leg I, namely, aa, ω 2, σ 2, and the famulus. These deficiencies are not unique, only indicative of a trend for reduction found in other Astigmata.

Family Gaudiellidae, new family

Diagnosis.—Small acaroid mites at present associated with stingless bees (*Melipona quadri-fasciata* Lep.). Female with small disc-shaped ambulacra supported on short stalks. Dorsal hysterosoma lacking external vertical setae as well as 1 pair of dorsal setae and sejugal suture; 3 pairs of lyrifissures present, 1 of which is mid-dorsal in position. Ventral idiosoma with reduced, simple coxosternal skeleton; midventral oviporous Y-shaped and partially covered by integumental flaps; numerous setae and 1 pair of lyrifissures near anal slit. Legs 5-segmented, each ending in a small disc-shaped ambulacrum on a short stalk; tarsi with setae u, v, p, q; tibia I with setae hT, gT; femur IV with wF.

Type-genus.—*Gaudiella*, new genus.

Genus *Gaudiella*, new genus

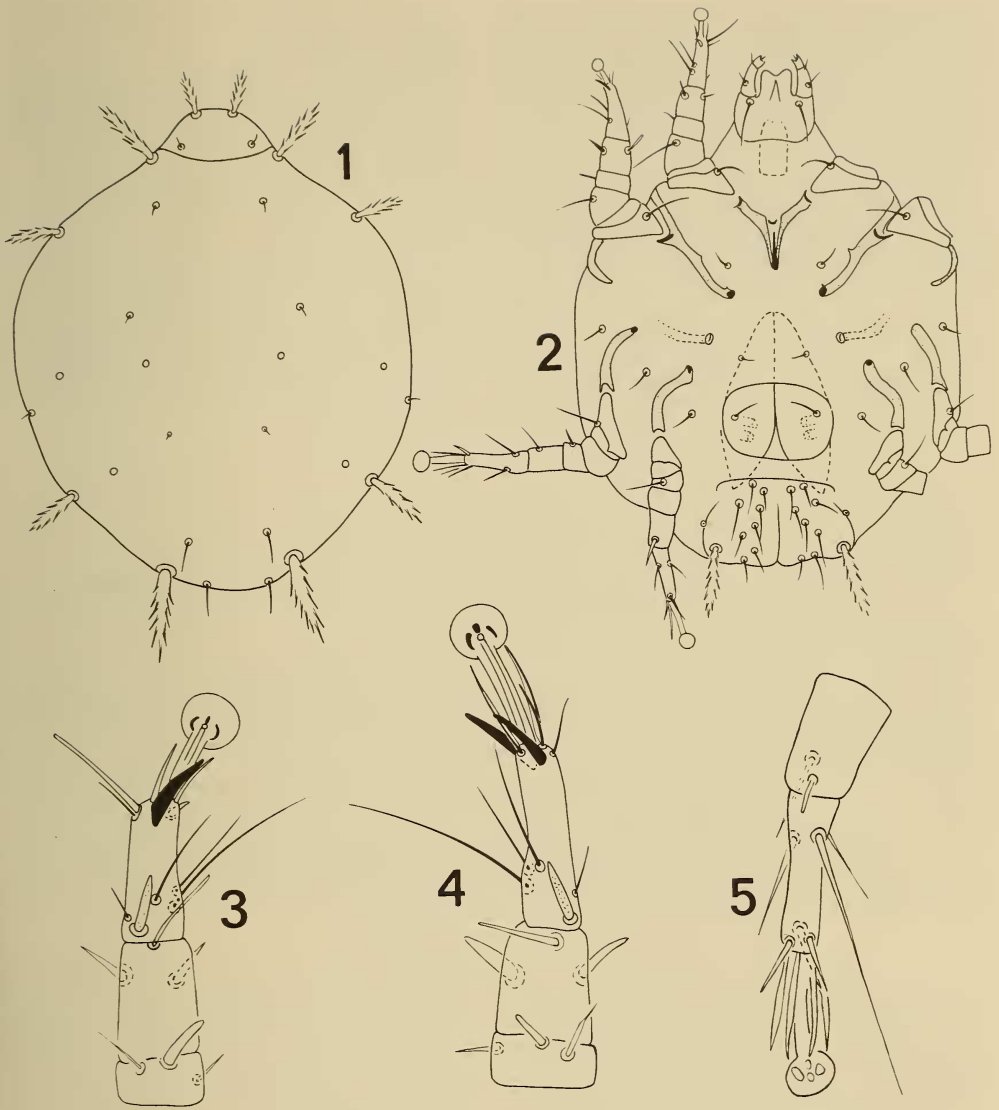
Diagnosis.—Acaroid mite parasitic (or phoretic) on South American stingless bees. Female with epimerites I fused, other epimerites simple; coxal fields I–IV open. Oviporus Y-shaped, partially covered by flaps; 2 pairs of genital setae, 2 pairs of well-developed genital discs. Anus subterminal, flanked by numerous pairs of anal and adanal setae subequal in length. Dorsum with antero- and poster-lateral setae enlarged, coarsely branched, with deep suture on prodorsum. Legs 5-segmented, each bearing small stalked ambulacral disc rather than empodial claw.

Type-species.—*Gaudiella minuta*, new species.

Gaudiella minuta, new species

(Figs. 1–5)

Female (holotype).—Small, ovoid with idiosoma 204 μ in length, 163 μ in width, covered by lightly sclerotized shields without striae. Dorsal idiosoma with prominent suture between rows of scapular setae; 3 pairs of lyrifissures (lyriform pores); setae vi, sci, l 1, l 3, l 4, l 5 enlarged



Gaudiella minuta, new species. Fig. 1, dorsum of female; fig. 2, venter of female; fig. 3, tarsus-tibia-genu of leg I; fig. 4, tarsus-tibia-genu of leg II; fig. 5, tarsus-tibia of leg IV.

with coarse branchings, other setae simple; setae *ve*, *l 2* (or *h*) lacking. Ventral idiosoma with Y-shaped epimerites I, other epimerites simple, slightly curved; all coxal fields open; remnant of epimerite III mesally with possible gland opening. Oviporus Y-shaped, covered anteriorly and posteriorly by flaps; posterior genital setae and coxal IV setae form transverse line. Anal slit flanked by 8 pairs of setae (anals, adanals) plus setae *d 5*, *l 5* and ventral lyrifissures.

Legs with pretarsi stalked with simple ambulacra; each ambulacral disc with 2 small unguiform sclerites flanking divided central sclerite. Chaetotaxy of legs I-IV as follows: trochanters, 1-1-1-0;

femora, 1-1-0-1; genua, 2-2-1-0; tibiae, 2-2-1-1, tarsi, 9-11-10-10. Solenidiotaxy: genua, 1-1-1-0; tibiae, 1-1-1-1; tarsi, 2-1-0-0. Tarsus I with setae *u* fused with *p* and *v* fused with *q*; setae lacking from maximal complement: *f*, *aa*, famulus. Tarsi II-IV with setae *p*, *q*, *u*, *v* independent.

Male.—Unknown.

Type Data.—Holotype, female deposited in the Department of Zoology, Universidade de São Paulo, Piracicaba, Brasil, ex *Melipona quadrifasciata* Lep., Ribeirão Preto, São Paulo, Brasil, De-

partment of Genetics, Faculdade de Medicina, October 1973, Dr. Velthuis (coll.), sent by H. Shimanuki of the Bee Laboratory, USDA, Beltsville, Maryland.

Remarks.—This mite is named for Dr. Jean Gaud, Laboratoire de Parasitologie, Faculté de Médecine, 35000-Rennes, France.

References Cited

Atyeo, Warren T., and J. Gaud. 1966. The chaetotaxy of Sarcoptiform feather mites

- (Acarina, Analgoidea). *J. Kansas Entomol. Soc.* 39(2): 337–346.
- Fain, A., and J. Bafort. 1967. Cycle éolutif et morphologie de *Hypodectes* (*Hypodectoides*) *propus* (Nitzsch) acarien nidicole à deutonymphe parasite tissulaire des pigeons. *Acad. Roy. Belgique, Bull. Cl. Sci. Sér. 5*, 53: 501–533.
- Grandjean, F. 1939. La chaetotaxie des pattes chez les Acaridiae. *Bull. Soc. Zool. France* 64: 50–60.
- Krantz, G. W. 1970. *A Manual of Acarology*, Oregon State Book Stores, 335 pp.
- Knülle, W. 1959. Morphologische und entwicklungsgeschichtliche Untersuchungen zum phylogenetischen System der Acari: Acariformes Zschv. II Acaridiae: Acaridae. *Mitt. Zool. Mus. Hamburg* 33(1): 97–213.

A New Species of Coccipolipus Parasitic on the Mexican Bean Beetle (Acarina: Podapolipidae)

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ABSTRACT

Coccipolipus epilachnae n. sp. is described and illustrated. Observations on the biology of the mite are discussed. The mite causes reduction in egg production of the Mexican bean beetle, *Epilachna varivestris* Mulsant.

I am describing a new species of *Coccipolipus* that was associated with the Mexican bean beetle, *Epilachna varivestris* Mulsant (Coccinellidae). Husband (1972) erected the genus *Coccipolipus* for *C. macfarlanei* Husband, which was found associated with the coccinellid *Cycloneda sanguinea* (L.). Feldman-Muhsam and Havivi (1972) described *Podapolipus* (*Bakerpolipus*) *coccinellae*, which was collected from the underside of the elytra of *C. sanguinea* together with the fungus *Hesperomyces*. They did not report adverse affects caused by the mite or fungus.

Coccipolipus epilachnae, new species
(Figs. 1–5)

According to Husband's (1972) key to species of *Coccipolipus* (which contains

4 species), *C. epilachnae* is more closely related to *C. macfarlanei* Husband than the other species of the genus. *C. epilachnae* can be separated from *C. macfarlanei* by the adult female having 2 pairs of legs; the male having a lateral spur on tibia I; and by the larviform female having 3 pairs of setae on the propodosoma. *C. macfarlanei* adult female has 1 pair of legs; the male has a spine on tibia I; and the larviform female has 2 pairs of setae on the propodosoma.

Female (Fig. 1): Gnathosoma wider than long, strongly sclerotized. Palpi reduced, without apparent setae on basal segments. Chelicerae not visible.

Idiosoma.—Eggshaped, smooth; without setae, and yellowish in alcohol; 5 subequal anterolateral lobes; dorsoventrally flat.

Legs.—Two pairs; 1st pair with 5 segments;